WE CLAIM:

1. An apparatus for identifying characteristics of tissue, comprising:

a radiation source configured to perform an axial scan of the tissue using radiation; and

an imaging system adapted to receive axial scan radiation based on the axial scan, and to process data relating to the axial scan radiation to identify characteristics of the tissue.

2. The apparatus of claim 1, wherein the radiation source is a light source configured to emit light.

3. The apparatus of claim 2, wherein the light source is a broad bandwidth light source.

4. The apparatus of claim 2, wherein the light source is a swept wavelength optical source.

5. The apparatus of claim 2, wherein the light source delivers radiation to the tissue via an optical fiber disposed in an insertion device having a distal end at least partially disposed within the insertion device and a proximal end.

6. The apparatus of claim 5, wherein the insertion device is configured to provide the distal end of the optical fiber adjacent to the tissue.

7. The apparatus of claim 5, wherein the insertion device is one of a barrel, a needle, and a stylet.

8. The apparatus of claim 1, wherein the imaging system further includes an interferometer adapted to direct a portion of the radiation emitted by the radiation source into a sample arm and detecting radiation reflected from the tissue back through the sample arm.

9. The apparatus of claim 8, wherein the interferometer directs another portion of the radiation into a reference arm.

10. The apparatus of claim 9, wherein the imaging system identifies characteristics of the tissue by processing the axial scan radiation to provide the characteristics of the tissue, the axial scan radiation including radiation received from the reference arm and radiation received from the sample arm, and comparing the characteristics of the tissue with a database of normalized characteristics of a plurality of tissue types.

11. The apparatus of claim 10, wherein the axial scan radiation includes at least one of backscattering, spectral properties, birefringence and Doppler shift.

12. The apparatus of claim 10, wherein the imaging system processes the axial scan radiation by performing at least one of standard deviation, average deviation, and slope of the axial reflectivity profile.

13. The apparatus of claim 10, wherein the imaging system inputs data derived from the axial scan radiation into a statistical model to predict tissue type.

14. The apparatus of claim 13, wherein the statistical model extracts features from data derived from the axial scan radiation.

15. The apparatus of claim 13, wherein the statistical model is at least one of partial least squares or principle component analysis.

16. The apparatus of claim 1, wherein the imaging system identifies the characteristics of the tissue by determining reflectance characteristics of the axial scan radiation using interferometric ranging, and comparing the characteristics of the tissue with normalized reflectance characteristics of a plurality of types of tissue stored in a database.

17. The apparatus of claim 16, wherein the type of interferometric ranging is at least one of optical time domain reflectometry, spectral domain reflectometry and optical frequency domain reflectometry.

18. A method for identifying characteristics of tissue, comprising the steps:

performing an axial scan of the tissue using radiation; and

processing data relating to the axial scan radiation based on the axial scan to identify characteristics of the tissue.

19. The method of claim 18, wherein the axial scan radiation includes at least one of backscattering, spectral properties, birefringence and Doppler shift.

20. The method of claim 18, wherein the processing step identifies the characteristics of the tissue by performing at least one of standard deviation of data associated with the axial scan radiation, average deviation of data associated with the axial scan radiation, and slope of the axial reflectivity profile of data associated with the axial scan radiation.

21. The method of claim 18, wherein a light source delivers the radiation to perform the axial scan of the tissue via an optical fiber disposed in an insertion device having a distal end at least partially disposed within the insertion device and a proximal end.

22. The method of claim 18, wherein the processing step identifies the characteristics of the tissue by inputting data derived from the axial scan radiation into a statistical model to predict tissue type.

23. The method of claim 18, wherein the processing step identifies the characteristics of the tissue by determining reflectance characteristics of the axial scan radiation using interferometric ranging and comparing the characteristics of the tissue with a database of stored normalized reflectance characteristics of a plurality of types of tissue.

24. A storage medium storing a software program for identifying characteristics of tissue, wherein the software program, when executed by a processing arrangement, is configured to cause the processing arrangement to execute the steps comprising of:

performing an axial scan of the tissue using radiation; and

processing data relating to the axial scan radiation to identify characteristics of the tissue.

25. The storage medium of claim 24, wherein the axial scan radiation includes at least one of backscattering, spectral properties, birefringence and Doppler shift.

26. The storage medium of claim 24, wherein the processing step identifies the characteristics of the tissue by performing at least one of standard deviation of data associated

with the axial scan radiation, average deviation of data associated with the axial scan radiation, and slope of the axial reflectivity profile of data associated with the axial scan radiation.

27. The storage medium of claim 24, wherein a light source delivers the radiation to perform the axial scan of the tissue via an optical fiber disposed in an insertion device having a distal end at least partially disposed within the insertion device and a proximal end.

28. The storage medium of claim 24, wherein the processing step identifies the characteristics of the tissue by inputting data derived from the axial scan radiation into a statistical model to predict tissue type.

29. The storage medium of claim 24, wherein the processing step identifies the characteristics of the tissue by determining reflectance characteristics of the axial scan radiation using interferometric ranging and comparing the characteristics of the tissue with a database of stored normalized reflectance characteristics of a plurality of types of tissue.

30. A logic arrangement for identifying characteristics of tissue, which, when executed by a processing arrangement, is operable to perform the steps comprising of:

performing an axial scan of the tissue using radiation; and

processing data relating to the axial scan radiation to identify characteristics of the tissue.

31. The logic arrangement of claim 24, wherein the axial scan radiation includes at least one of backscattering, spectral properties, birefringence and Doppler shift.

32. The logic arrangement of claim 24, wherein the processing step identifies the characteristics of the tissue by performing at least one of standard deviation of data associated with the axial scan radiation, average deviation of data associated with the axial scan radiation, and slope of the axial reflectivity profile of data associated with the axial scan radiation.

33. The logic arrangement of claim 24, wherein a light source delivers the radiation to perform the axial scan of the tissue via an optical fiber disposed in an insertion device having a distal end at least partially disposed within the insertion device and a proximal end.

34. The logic arrangement of claim 24, wherein the processing step identifies the characteristics of the tissue by inputting data derived from the axial scan radiation into a statistical model to predict tissue type.

35. The logic arrangement of claim 24, wherein the processing step identifies the characteristics of the tissue by determining reflectance characteristics of the axial scan radiation using interferometric ranging and comparing the characteristics of the tissue with a database of stored normalized reflectance characteristics of a plurality of types of tissue.

36. An apparatus for identifying characteristics of tissue, comprising:

a radiation source configured to deliver radiation to the tissue; and

an imaging system adapted to receive the radiation and process unidimensional data relating to the radiation to identify characteristics of the tissue.

37. An apparatus for identifying characteristics of tissue, comprising:

at least one optical fiber, one of the at lest one optical fiber disposed in a needle having a distal end at least partially disposed within the needle and a proximal end, the distal end of the one of the at least one optical fiber adapted to be placed adjacent to tissue; and,

an imaging system in communication with the proximal end of the one of the at least one optical fiber, and configured to process reflected light from the at least one optical fiber to identify the tissue.

38. The apparatus of claim 37, wherein the reflected light is unidimensional light.

39. The apparatus of claim 37, wherein the reflected light is generated to perform an axial scan.